

Name _____

More Complicated Inheritance Patterns

INCOMPLETE DOMINANCE: Remember, here the different alleles cause a blended new phenotype.

1. In four o'clock flowers, red (R) is incompletely dominant over white (W).
Cross two pink (RW) parents. Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities indicated.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Red _____

White _____

Pink _____

Phenotypic ratio:

2. Now cross a red flower with a white flower. Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Red _____

White _____

Pink _____

Phenotypic ratio:

3. What cross would result in a phenotypic ratio of 1 red: 2 pink: 1 white?
Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

4. What cross would result in a phenotypic ratio of 1 red: 1 pink?
Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

5. In squash plants, round squash (R) are incompletely dominant over long squash (L). Cross 2 oval (RL) parents. Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities indicated.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Round _____

Long _____

Oval _____

Phenotypic ratio:

6. Now cross a round squash with an oval squash. Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Round _____

Long _____

Oval _____

Phenotypic ratio:

7. What cross would result in offspring that are all oval?

Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

8. What cross would result in a phenotypic ratio of 1 oval: 1 long?

Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

CODOMINANCE: Remember, here two alleles can both be dominant and express or show themselves equally.

9. In chickens, black feathers (BB) are codominant with white feathers (WW). The heterozygous genotype (BW) results in erminette, or speckled black AND white feathers. Cross two erminette chickens. Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities indicated.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Black _____

White _____

Erminette _____

Phenotypic ratio:

10. Now cross an erminette chicken with a white chicken. Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities indicated.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Black _____

White _____

Erminette _____

Phenotypic ratio:

11. What cross would result in a phenotypic ratio of 1 black: 1 erminette?
Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

12. What cross would result offspring that are all erminette?
Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

13. In shorthorn cattle red coat color (RR) is codominant with white coat color (WW).

The heterozygous genotype (RW) results in a roan, or red AND white coat color.

Cross a red bull (male) with a white cow (female). Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Red _____

White _____

Roan _____

Phenotypic ratio:

14. Now cross a roan bull with a red cow. Write the genotypes of the parents, show a Punnett square, complete the genotypic and phenotypic ratios of the offspring, and determine the probabilities.

Genotypes of parents: _____ x _____

Genotypic ratio:

Probability offspring is:

Red _____

White _____

Roan _____

Phenotypic ratio:

15. What cross would result in a phenotypic ratio of 1 roan: 1 white?

Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

16. What cross would result in a phenotypic ratio of 1 red: 2 roan: 1 white?

Show a Punnett square to support your answer.

Genotypes of parents _____ x _____

MULTIPLE ALLELES: Many traits involve more than just two alleles. For example, in humans, ABO blood types are determined by three alleles; A, B, and O. (Furthermore, A and B are codominant over the recessive allele O.)

17. Blood types display codominance in the form of multiple alleles. Complete the following crosses. Show a Punnett square and then write the genotypic and phenotypic ratios of the offspring for each.

- (a) Type A (homozygous) x Type B (homozygous)
- (b) Type A (homozygous) x Type B (heterozygous)
- (c) Type A (heterozygous) x Type B (homozygous)

a. ♂ _____ X _____ ♀

b. ♂ _____ X _____ ♀

c. ♂ _____ X _____ ♀

Genotype Ratio:

Genotype Ratio:

Genotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

18. Complete the following crosses. Show a Punnett square and then write the genotypic and phenotypic ratios of the offspring for each.

- (a) Type AB x Type AB
- (b) Type AB x Type O
- (c) Type A (heterozygous) x Type B (heterozygous)

a. ♂ _____ X _____ ♀

b. ♂ _____ X _____ ♀

c. ♂ _____ X _____ ♀

Genotype Ratio:

Genotype Ratio:

Genotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

19. Could a parent with type AB blood and a parent with type O blood have a child with type O blood? Explain why or why not. Draw a Punnett square to support your answer.

20. Blood types display codominance in the form of multiple alleles. Complete the following crosses. Show a Punnett square and then write the genotypic and phenotypic ratios of the offspring for each.

- (a) Type A (homozygous) x Type O
- (b) Type A (heterozygous) x Type AB
- (c) Type A (heterozygous) x Type O

a. ♂ _____ X _____ ♀

b. ♂ _____ X _____ ♀

c. ♂ _____ X _____ ♀

Genotype Ratio:

Genotype Ratio:

Genotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

21. Complete the following crosses. Show a Punnett square and then write the genotypic and phenotypic ratios of the offspring for each.

- (a) Type B (homozygous) x Type AB
- (b) Type B (heterozygous) x Type O
- (c) Type B (heterozygous) x Type AB

a. ♂ _____ X _____ ♀

b. ♂ _____ X _____ ♀

c. ♂ _____ X _____ ♀

Genotype Ratio:

Genotype Ratio:

Genotype Ratio:

Phenotype Ratio:

Phenotype Ratio:

Phenotype Ratio: